

ต้นฉบับ หน้าขาดหาย

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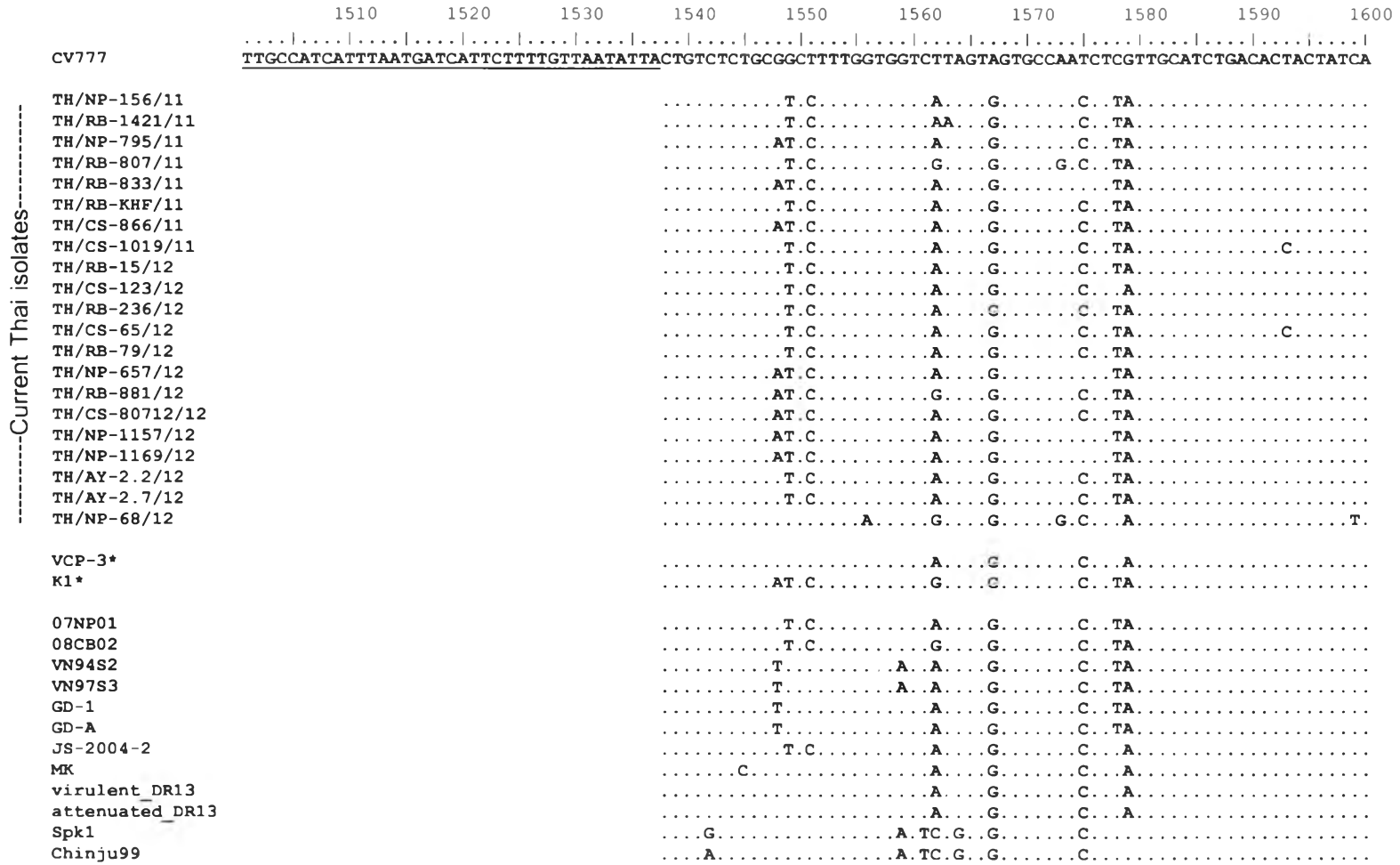
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APPENDIX

Appendix A: Figure of sequence alignment of current Thai isolates and reference isolates based on partial S gene sequences



-----Current Thai isolates-----

* PED vaccine strains

	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700
CV777	ATGGGTTTAGTTCTTTCTGTGTGACACTAGACAATTTACCATTACACTGTTTTATAATGTTACAAACAGTTATGGTTATGTGCTAAATCACAGGATAG									
TH/NP-156/11				T		C			GT	C
TH/RB-1421/11				T		C				C
TH/NP-795/11				T		C				C
TH/RB-807/11				T		C			C	C
TH/RB-833/11				T		C				C
TH/RB-KHF/11		T		T		C			C	C
TH/CS-866/11				T		C			C	C
TH/CS-1019/11				T		C				C
TH/RB-15/12				T		C			T	C
TH/CS-123/12		T		T		C				C
TH/RB-236/12				T		C			T	C
TH/CS-65/12				T		C				C
TH/RB-79/12				T		C			T	A.C
TH/NP-657/12				T		C				C
TH/RB-881/12				T		C				C
TH/CS-80712/12				T		C				C
TH/NP-1157/12				T		C				C
TH/NP-1169/12				T		C				C
TH/AY-2.2/12				T		C			T	C
TH/AY-2.7/12				T		C			T	C
TH/NP-68/12			A			C	C			G
VCP-3*						C			G	
K1*				T		C				C
07NP01				T		C				C
08CB02				T		C				C
VN94S2				T		C				C
VN97S3				T		C				C
GD-1				T		C			C	C
GD-A				T		C			C	C
JS-2004-2				T		C				C
MK				T		C				C
virulent_DR13						C				C
attenuated_DR13						C			G	
Spk1	C				G	C	C	G		
Chinju99			A		C	C	C			

* PED vaccine strains

-----Current Thai isolates-----

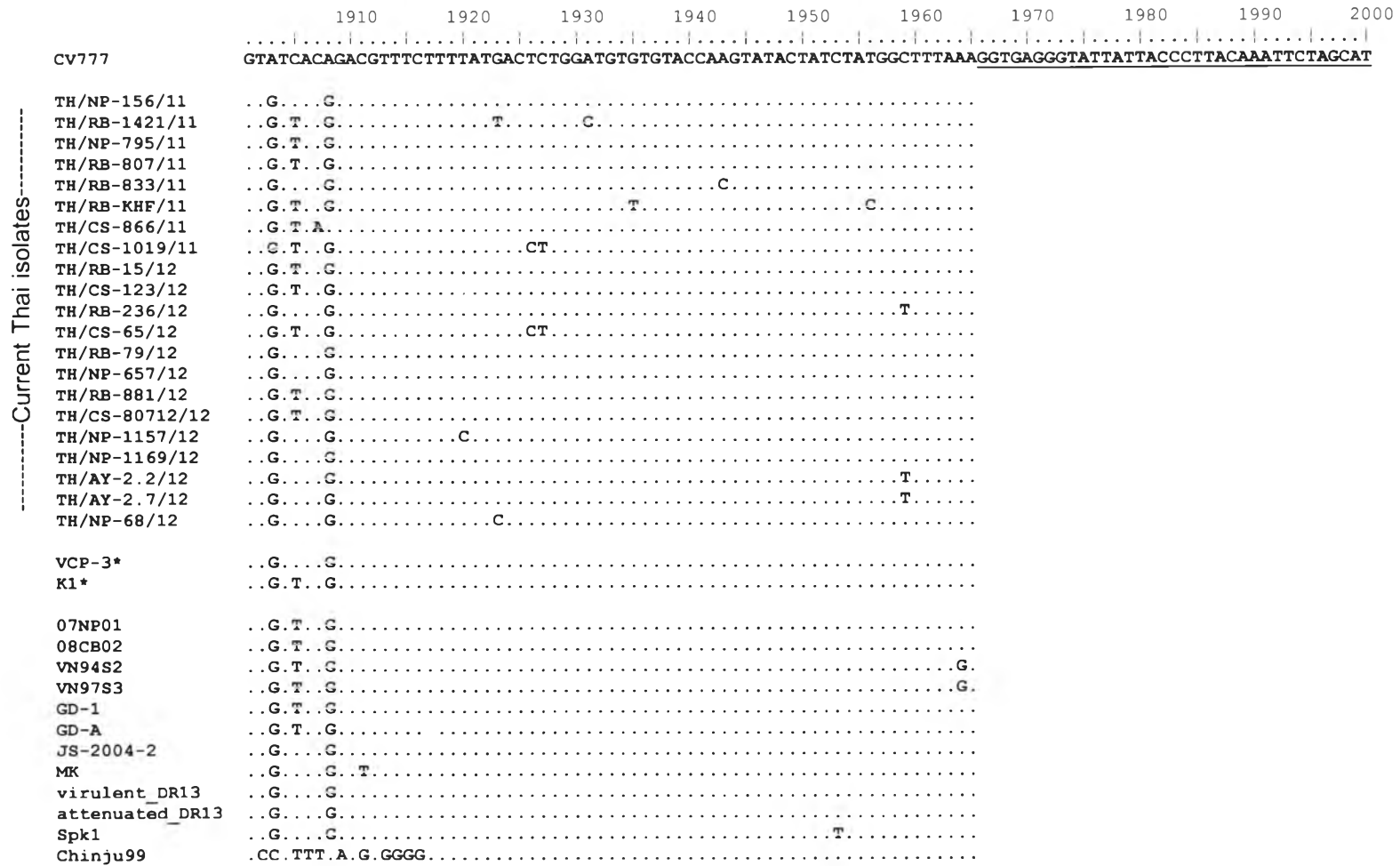
	1710	1720	1730	1740	1750	1760	1770	1780	1790	1800
CV777	T	A	A	T	T	T	T	T	T	T
TH/NP-156/11	C	T				T		A	C	
TH/RB-1421/11	C	T				A	T	A	C	
TH/NP-795/11	G	C	T				T	A	A	C
TH/RB-807/11	C	T	T	T		GG		A	C	
TH/RB-833/11	C	T					T	A	C	
TH/RB-KHF/11	C	T	A		G	G	T	A	C	
TH/CS-866/11	C	T					T	A	C	
TH/CS-1019/11	C	T					T	A	C	
TH/RB-15/12	C	T					T	A	C	
TH/CS-123/12	C	T			G		T	A	A	C
TH/RB-236/12	C	T					T	A	C	
TH/CS-65/12	C	T					T	A	C	
TH/RB-79/12	C	T					T	A	C	
TH/NP-657/12	C	T					T	A	C	
TH/RB-881/12	C	T					T	A	C	
TH/CS-80712/12	C	T					T	A	C	
TH/NP-1157/12	C	T					T	A	C	
TH/NP-1169/12	C	T					T	A	C	
TH/AY-2.2/12	C	T					T	A	C	
TH/AY-2.7/12	C	T					T	A	C	
TH/NP-68/12	C			T		G				
VCP-3*	C									
K1*	C	T					T	A	C	
07NP01	C	T					T	A	C	
08CB02	C	T					T	A	C	
VN94S2	C	T					T	A	C	
VN97S3	C	T					T	A	C	
GD-1	C	T					T	A	C	
GD-A	C	T					T	A	C	
JS-2004-2	C						T	A	C	
MK	C		A							C
virulent_DR13	C									
attenuated_DR13	C									
Spk1	C	C								
Chinju99	C	C								

* PED vaccine strains

-----Current Thai isolates-----

	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900
CV777	TTTGGTTACCCTGCGTTCGGTAGTGGTGTAAAGTTGACGTCCCTTTATTTTCAATTCACAAAAGGTGAGTTGATTACTGGCAGCCATAAACCACTTGAAG									
TH/NP-156/11	A	T	C	C	G	A				
TH/RB-1421/11	A	T	T	C	G				C	
TH/NP-795/11	AT	T	C	C	G					
TH/RB-807/11	A	T	C	C	G			GG		
TH/RB-833/11	A	T	C	C	G					
TH/RB-KHF/11	A	T	G	C	C	G			T	
TH/CS-866/11	A	T	C	C	G					
TH/CS-1019/11	AT	T	T	C	G				G	
TH/RB-15/12		T	C	C	GG					
TH/CS-123/12	AT	T	C	C	G				C	
TH/RB-236/12	A	T	C	C	G					
TH/CS-65/12	AT	T	T	C	G					
TH/RB-79/12	C	A	T	C	C	G				
TH/NP-657/12	A	T	C	C	G					
TH/RB-881/12	AT	T	C	C	G					
TH/CS-80712/12	AT	T	C	C	G					
TH/NP-1157/12	A	T	C	C	G					
TH/NP-1169/12	A	T	C	C	G					
TH/AY-2.2/12	A	T	C	C	G					
TH/AY-2.7/12	A	T	C	C	G					
TH/NP-68/12	AT		T		G	T		A		
VCP-3*	A		T		G				C	
K1*	AT	T	C	C	G					
07NP01	A	T	C	C	G					
08CB02	A	T	C	C	G					
VN94S2	A	T	C	C	G					
VN97S3	G	A	T	C	C	G				
GD-1	A	T	C	C	G					
GD-A	A	T	C	C	G					
JS-2004-2	A	T	T	C	GG					
MK	T	A	C	T	G			T		
virulent_DR13	A		T		G					
attenuated_DR13	A		T		G				C	
Spk1	T		T	C	G					
Chinju99	T		T	AC	G	C	G	T	GG	A
									CT	AA

* PED vaccine strains



* PED vaccine strains

Figure19: The partial S gene nucleotide sequences alignment of current Thai isolates as compared to reference isolates.

-----Current Thai isolates-----

	510	520	530	540	550	560	570	580	590	600	
CV777	<u>LPSFNDHSFVNITVSAAFGLSSANLVSADTTINGFSSFCVDTRQFTITLFYNTVNSYGYVSKSQDSNCPFTLQSVNDYLSFSKFCVSTSLLAGACTIDL</u>										
TH/NP-156/11	S	H	G	I		S		S		S	
TH/RB-1421/11	S	Q	G	I		S			I	S	
TH/NP-795/11	S	H	G	I		S		K		N	S
TH/RB-807/11	S	R	G	D	I	S		N		R	S
TH/RB-833/11	S	H	G	I		S				S	
TH/RB-KHF/11	S	H	G	I	F	S		N	I	G	S
TH/CS-866/11	S	H	G	I		S		N		S	
TH/CS-1019/11	S	H	G	I		S				S	
TH/RB-15/12	S	H	G	I		S		N		S	
TH/CS-123/12	S	H	G	I	F	S		N		R	DS
TH/RB-236/12	S	H	G	I		S		N		S	
TH/CS-65/12	S	H	G	I		S				S	
TH/RB-79/12	S	H	G	I		S		N	N	S	
TH/NP-657/12	S	H	G	I		S				S	
TH/RB-881/12	S	R	G	I		S				S	
TH/CS-80712/12	S	H	G	I		S				S	
TH/NP-1157/12	S	H	G	I		S				S	
TH/NP-1169/12	S	H	G	I		S				S	
TH/AY-2.2/12	S	H	G	I		S		N		S	
TH/AY-2.7/12	S	H	G	I		S		N		S	
TH/NP-68/12	D	R	G	D	I	E		G		R	
VCP-3*	H	G	I								
K1*	S	R	G	I		S				S	
07NP01	S	H	G	I		S				S	
08CB02	S	R	G	I		S				S	
VN94S2	DH	G	I		S					S	
VN97S3	DH	G	I		S					S	
GD-1	H	G	I		S					S	
GD-A	H	G	I		S					S	
JS-2004-2	S	H	G	I		S				S	
MK	H	G	I								
virulent_DR13	H	G	I								
attenuated_DR13	H	G	I								
Spk1	DSGG				R	S					
Chinju99	DSGG				R						

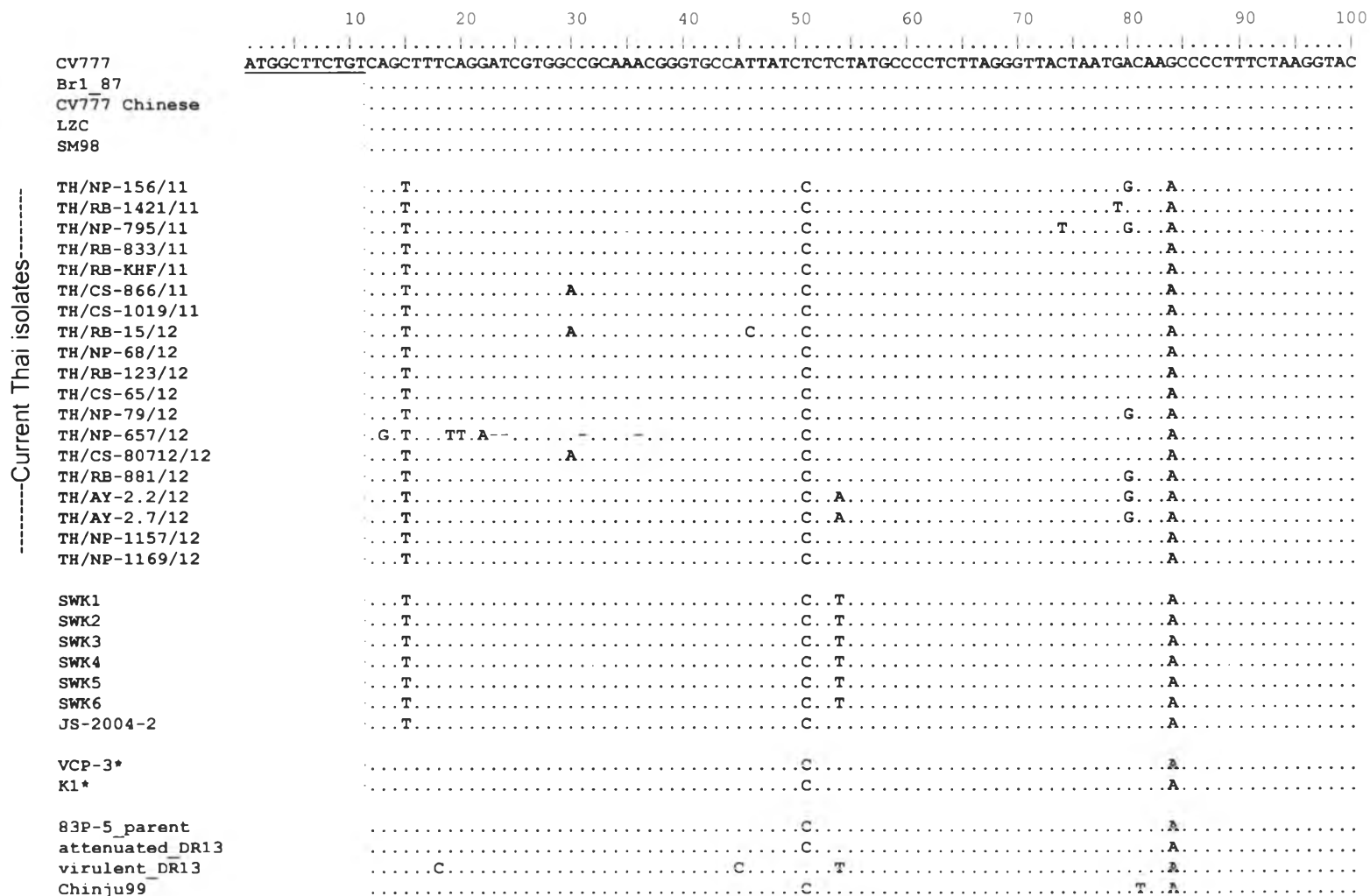
* PED vaccine strains

	610	620	630	640	650	660	670	680	690	700
CV777	FGYPAFGSGVKLTSLYFQFTKGLITGTPKPLEGITDVSFMTLDVCTKYTIYGFK <u>EGEIIITLTNSSILAGVYYTSDSGQLLAFKNVTSGAVYSVTPCSFS</u>									
TH/NP-156/11	E	F	S	V						
TH/RB-1421/11	E	F		V	I	G				
TH/NP-795/11	D	F		V						
TH/RB-807/11	E	F	G	V						
TH/RB-833/11	E	F		V	T					
TH/RB-KHF/11	E	G	F	V	V					
TH/CS-866/11	E	F		V	K					
TH/CS-1019/11	D	F		G	V					
TH/RB-15/12	D	F	E	V						
TH/CS-123/12	D	F		Q	V					
TH/RB-236/12	E	F		V						
TH/CS-65/12	D	F		V						
TH/RB-79/12	E	F		V						
TH/NP-657/12	E	F		V						
TH/RB-881/12	D	F		V						
TH/CS-80712/12	D	F		V						
TH/NP-1157/12	E	F		V						
TH/NP-1169/12	E	F		V						
TH/AY-2.2/12	E	F		V						
TH/AY-2.7/12	E	F		V						
TH/NP-68/12	D	F	D	V	I					
VCP-3*	E	F		Q	V					
K1*	D	F		V						
07NP01	E	F		V						
08CB02	E	F		V						
VN94S2	E	F		V					I	
VN97S3	AE	F		V					I	
GD-1	E	F		V						
GD-A	E	F		V						
JS-2004-2	E	F	E	V						
MK	E	F		V						
virulent_DR13	E	F		V						
attenuated_DR13	E	F		Q	V					
Spk1	E	F		V						
Chinju99		NYR		W	WA		N	LLKGG		

* PED vaccine strains

Figure20: The partial S gene amino acid sequences alignment of current Thai isolates as compared to reference isolates.

Appendix B: Figure of sequence alignment of current Thai isolates and reference isolates based on partial N gene sequences



* PED vaccine strains

	110	120	130	140	150	160	170	180	190	200
CV777	TTGCAAAACAACGCTGTACCCACTAACAAGGGGAATAAGGACCAGCAAATTTGGGTACTGGAATGAGCAAATTCGCTGGCGCATGCGCCGTGGTGAGCGAAT									
Br1_87	.....								
CV777_Chinese	.....								
LZC	.....								
SM98	.....								
-----Current Thai isolates-----										
TH/NP-156/11	T	T	T	A	A		A			
TH/RB-1421/11	T	T	T	A	A		C			
TH/NP-795/11	T	T	T	A	A	T	A			
TH/RB-833/11	T	T	T	A	A		A			
TH/RB-KHF/11	T	T	T	A	A		A			
TH/CS-866/11	T	T	T	A	A		A			
TH/CS-1019/11	T	T	T	A	A		A	T		
TH/RB-15/12	T	T	T	A	A		A		C	
TH/NP-68/12	T	T	T	A	A		A		C	C
TH/RB-123/12	T	T	T	A	A		A			
TH/CS-65/12	T	T	T	A	A		A	T		
TH/NP-79/12	T	T	T	A	A	T	C			
TH/NP-657/12	T	T	T	A	A		A			
TH/CS-80712/12	T	T	T	A	A		A			
TH/RB-881/12	T	T	T	A	A	T	A			
TH/AY-2.2/12	T	T	T	A	A	T	A			
TH/AY-2.7/12	T	T	T	A	A	T	A			
TH/NP-1157/12	T	T	T	A	A		A			
TH/NP-1169/12	T	T	T	A	A		A			
SWK1	T	T	T	A	A		A			
SWK2	T	T	T	A	A		A			
SWK3	T	T	T	A	A		A			
SWK4	T	T	T	A	A		A			
SWK5	T	T	T	A	A		A			
SWK6	T	T	T	A	A		A			
JS-2004-2	T	T	T	A	A		A			
VCP-3*	C		T				A			
K1*			A				A			
83P-5_parent			T				A			
attenuated_DR13	C		T				A			
virulent_DR13							A			
Chinju99								T		

* PED vaccine strains

	210	220	230	240	250	260	270	280	290	300
CV777	TGAACAACCTTCCAATTGGCATTCTACTACCTCGGAACAGGACCTCACGGCGACCTCCGTTATAGGACTCGTACTGAGGGTGTCTTCTGGGTTCCTAAA									
Br1 87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....								
-----Current Thai isolates-----										
TH/NP-156/11						C		C		
TH/RB-1421/11						C		C		
TH/NP-795/11						C		C		
TH/RB-833/11						C		C		C
TH/RB-KHF/11						C		C		
TH/CS-866/11						C		C		
TH/CS-1019/11						C		C		
TH/RB-15/12					T	C		C		
TH/NP-68/12		C				C		C		
TH/RB-123/12						C		C		C
TH/CS-65/12						C		C		
TH/NP-79/12						C		C		
TH/NP-657/12						C		C	C	C
TH/CS-80712/12						C		C		
TH/RB-881/12						C		C		
TH/AY-2.2/12						C		C		
TH/AY-2.7/12						C		C		
TH/NP-1157/12						C		C		
TH/NP-1169/12						C		C	C	C
SWK1						C		C		
SWK2						C		C		
SWK3						C		C		
SWK4						C		C		
SWK5						C		C		
SWK6						C		C		
JS-2004-2						C		C		
VCP-3*						C				
K1*		C				C				
83P-5_parent						C				
attenuated_DR13						C				
virulent_DR13						C				
Chinju99			A							C

* PED vaccine strains

	310	320	330	340	350	360	370	380	390	400
CV777	GAAGGCGCAAAGACTGAACCCACTAATTTGGGTGTCAGAAAGCGCTGAAAAGCCAATCATTCCAAAATTCTCAACAGCTCCCAGTGTAGTTGAGA									
Br1 87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....T.....									
TH/NP-156/11	.....CC.....T..T.....T...C.....									
TH/RB-1421/11	.....A.....CC.....T.....T..T.....T...C.....									
TH/NP-795/11	.....CC.....T..T.....T...C.....									
TH/RB-833/11	.....CC.....T..T.....T...C.....									
TH/RB-KHF/11	.....CC.....T..T.....T...TC.....									
TH/CS-866/11	.....CC.....C...T..T.....T...C.....									
TH/CS-1019/11	.....CC.....T..T.....T...CA.....									
TH/RB-15/12	.....CC.....C...T..T.....T...C.....									
TH/NP-68/12	.....CC.....T..T.....T...C.....									
TH/RB-123/12	.....CC.....T..T.....T...C.....									
TH/CS-65/12	.....CC.....T..T.....T...CA.....									
TH/NP-79/12	.....CC.....C..T.....T...C.....									
TH/NP-657/12	.....CC.....T..T.....T...C.....									
TH/CS-80712/12	.....CC.....C...T..T.....T...C.....									
TH/RB-881/12	.....CC.....T..T.....T...C.....									
TH/AY-2.2/12	.....CC.....T..T.....T...C.....									
TH/AY-2.7/12	.....CC.....T..T.....T...C.....									
TH/NP-1157/12	.....CC.....T..T.....T...C.....									
TH/NP-1169/12	.....CC.....T..T.....T...C.....									
SWK1	.....CC.....T.....T...C.....									
SWK2	.....CC.....T.....T...C.....									
SWK3	.....CC.....T.....T...C.....									
SWK4	.....CC.....T.....T...C.....									
SWK5	.....CC.....T.....T...C.....									
SWK6	.....CC.....T.....T...C.....									
JS-2004-2	.....CC.....T.....T...C.....									
VCP-3*	.....C.....T.....									
K1*	.....C.....A.....T...T.....									
83P-5_parent	.....C.....T.....									
attenuated_DR13	.....C.....T.....									
virulent_DR13	.....C.....CC.....A.....									
Chinju99	.....A.....A.....CC.....A.....									

-----Current Thai isolates-----

* PED vaccine strains

	410	420	430	440	450	460	470	480	490	500
CV777	TTGTTGAACCTAACACACCTCCTGCCTTCACGTGCAAATTCGCGTAGCAGGAGTCGTGGCAATGGCAACAATAGGTC TAGATCTCCAAGTAACAACAGAGG									
Brl_87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....								
TH/NP-156/11	A		T	A		T		C		
TH/RB-1421/11	A		A		T		C	C		
TH/NP-795/11	A		A		T		C	C		
TH/RB-833/11	AT		A		T		C	C		
TH/RB-KHF/11	A		A	G	T		C	C		
TH/CS-866/11	A	T	A		T		C	C		
TH/CS-1019/11	A		A	G	T		C	C		
TH/RB-15/12			A		T		CG	C		
TH/NP-68/12	C	A	A		T	T		C		
TH/RB-123/12	AT		A		T		C	C		T
TH/CS-65/12	A		A	G	T		C	C		
TH/NP-79/12	A	T	A		T		C	C		
TH/NP-657/12	AT		A		T		C	C		T
TH/CS-80712/12	A	T	A		T		C	C		
TH/RB-881/12	A		A		T		CG	C		T
TH/AY-2.2/12	A		A		T		C	C		
TH/AY-2.7/12	A		A		T		C	C		
TH/NP-1157/12	A		A	G	T		C	C		
TH/NP-1169/12	AT		A	G	T		C	C		T
SWK1	A		A		T		C	C		
SWK2	A		A		T		C	C		
SWK3	A		A		T		C	C		
SWK4	A		A		T		C	C		
SWK5	A		A		T		C	C		
SWK6	A		A		T		C	C		
JS-2004-2	A		A		T	T		C	C	
VCP-3*			A					C	C	G
K1*			A					C	C	G
83P-5_parent			A					C	C	G
attenuated_DR13			A					C	C	G
virulent_DR13	A	T	A		T		TC	C	C	G
Chinju99		T			T			C	C	C

* PED vaccine strains

	510	520	530	540	550	560	570	580	590	600
CV777	CAATAACCAGTCCCGTGGTAATTCACAGAATCGTG	GAAATAACCAGGGTCGTGGAGCTTCTCAGAACAGAGGAGGCAATAATAACAATAACAAGTCT								
Br1 87										
CV777 Chinese										
LZC										
SM98			G							
TH/NP-156/11			C							
TH/RB-1421/11		T	C							
TH/NP-795/11			C							
TH/RB-833/11			C							
TH/RB-KHF/11			C							
TH/CS-866/11			C		G		T			
TH/CS-1019/11			C							
TH/RB-15/12			C				T			
TH/NP-68/12			C							
TH/RB-123/12			C							
TH/CS-65/12			C							
TH/NP-79/12			C							
TH/NP-657/12			C							
TH/CS-80712/12			C		G		T		T	
TH/RB-881/12			C							
TH/AY-2.2/12			C							
TH/AY-2.7/12			C							
TH/NP-1157/12			C			G				
TH/NP-1169/12			C							
SWK1			C							
SWK2			C							
SWK3			C							
SWK4			C							
SWK5			C							
SWK6			C							
JS-2004-2			C							
VCP-3*		C								
K1*		C						T		
83P-5_parent		C								
attenuated_DR13		C								
virulent_DR13		C								
Chinju99		C								

* PED vaccine strains

-----Current Thai isolates-----

	610	620	630	640	650	660	670	680	690	700
CV777	CGTA	ACCAGT	CCAATAACAGGA	ACCAGTCAAATGACCGTGGTGGT	GTAACATCACGCGATGATCTGGTGGCTGCTGTCAAGGATGC	CACTTAAATCTTTGG				
Br1_87										
CV777 Chinese										
LZC										
SM98										
TH/NP-156/11		G	A		T			C		C
TH/RB-1421/11		G	A				T			C
TH/NP-795/11		G	A							C
TH/RB-833/11		G	A							C
TH/RB-KHF/11		G	A							C
TH/CS-866/11		G	A							C
TH/CS-1019/11		G	A							C
TH/RB-15/12		G	A			G				C
TH/NP-68/12			A		T					C
TH/RB-123/12		G	A							C
TH/CS-65/12		G	A							C
TH/NP-79/12		G	A				T			C
TH/NP-657/12		G	A							C
TH/CS-80712/12		G	A							C
TH/RB-881/12		G	A							C
TH/AY-2.2/12		G	A							C
TH/AY-2.7/12		G	A							C
TH/NP-1157/12		G	A							C
TH/NP-1169/12		G	A							C
SWK1		G	A							C
SWK2		G	A							C
SWK3		G	A							C
SWK4		G	A							C
SWK5		G	A							C
SWK6		G	A							C
JS-2004-2		G	A			AA	G			C
VCP-3*		G				AA	G			C
K1*	T	G	A		T	AA	G	G		C
83P-5_parent		G				AA	G			C
attenuated_DR13		G				AA	G			C
virulent_DR13		G	G							C
Chinju99		G	G			G		C		C

-----Current Thai isolates-----

* PED vaccine strains

	710	720	730	740	750	760	770	780	790	800	
CV777	GTATTGGAGAAAATCCTGACAGGCATAAGCAACAGCAGAAGCCTAAGCAGGAAAAGTCTGACAACAGCGGCAAAAATACACCTAAGAAGAACAAATCCAG										
Br1_87	.....									
CV777 Chinese	.....									
LZC	.....									
SM98	.....									
TH/NP-156/11	C	C	A	T	C	A	G	C	.....	
TH/RB-1421/11	C	C	A	T	C	A	G	G	T	.....
TH/NP-795/11	C	C	A	T	C	A	G	G	.....	
TH/RB-833/11	C	G	C	A	T	T	C	A	G	G	.....
TH/RB-KHF/11	C	C	A	T	C	A	G	C	C	.....
TH/CS-866/11	C	C	T	A	T	C	A	G	G	.....
TH/CS-1019/11	C	CA	A	TT	C	A	G	G	.....	
TH/RB-15/12	C	C	A	T	C	A	G	C	.....	
TH/NP-68/12	C	GC	A	T	C	A	G	G	.....	
TH/RB-123/12	C	C	T	A	T	C	A	G	G	.....
TH/CS-65/12	C	CA	A	TT	C	A	G	C	.....	
TH/NP-79/12	C	C	A	T	C	A	G	C	.....	
TH/NP-657/12	C	G	C	A	T	C	A	G	.....	
TH/CS-80712/12	CA	C	T	A	T	C	A	G	.....	
TH/RB-881/12	C	C	T	A	T	C	A	G	.....	
TH/AY-2.2/12	C	C	A	T	C	A	G	G	.....	
TH/AY-2.7/12	C	C	A	T	C	A	G	G	.....	
TH/NP-1157/12	C	G	C	A	T	C	A	G	.....	
TH/NP-1169/12	C	G	C	A	T	C	A	G	.....	
SWK1	C	C	C	A	T	C	A	G	.....	
SWK2	C	C	C	A	T	C	A	G	.....	
SWK3	C	C	C	A	T	C	A	G	.....	
SWK4	C	C	C	A	T	C	A	G	.....	
SWK5	C	C	C	A	T	C	A	G	.....	
SWK6	C	C	C	A	T	C	A	G	.....	
JS-2004-2	C	A	T	C	A	G	C	C	T	.....
VCP-3*	.....A.....										
K1*	.....									
83P-5_parent	.....A.....										
attenuated_DR13	.....A.....										
virulent_DR13	C	T	A	G	G	.....				
Chinju99	C	C	G	.....						

-----Current Thai isolates-----

* PED vaccine strains

	810	820	830	840	850	860	870	880	890	900
CV777	GGCCACTTCGAAGGAACGTGACCTCAAAGACATCCCAGAGTGGAGGAGAATTCCCAAGGGCGAAAATAGCCGTAGCAGCTTGCTTCGGACCCAGAGGGGGC									
Br1_87	.....								
CV777 Chinese	.....								
LZC	.....GG.T.....									
SM98	.....								
-----Current Thai isolates-----										
TH/NP-156/11	A	A					C			G.A
TH/RB-1421/11	A	A								G.A
TH/NP-795/11	A	A								G.A
TH/RB-833/11	A	A					C			C.A
TH/RB-KHF/11	A	A				T				G.A
TH/CS-866/11	A	A								G.A
TH/CS-1019/11	A	A								G.A
TH/RB-15/12	A	A								G.A
TH/NP-68/12	A	A								G.A
TH/RB-123/12	A	A								G.A
TH/CS-65/12	A	A								C.A
TH/NP-79/12	A	A					C			G.A
TH/NP-657/12	A	A						T		G.A
TH/CS-80712/12	A	A								G.A
TH/RB-881/12	A	A								G.A
TH/AY-2.2/12	A	A								G.A
TH/AY-2.7/12	A	A								G.A
TH/NP-1157/12	A	A						T		G.A
TH/NP-1169/12	A	A						T		G.A
SWK1	A	A								C.A
SWK2	A	A								G.A
SWK3	A	A								G.A
SWK4	A	A								G.A
SWK5	A	A								G.A
SWK6	A	A								G.A
JS-2004-2	A	A								G.A
VCP-3										G
K1_							T			G
83P-5_parent										G
attenuated_DR13										G
virulent_DR13								CG		G.A
Chinju99			T							G
* PED vaccine strains										

	910	920	930	940	950	960	970	980	990	1000
CV777	TTCAAAAAC TTTGGAGATGCGGAATTTGTCGAAAAAGGTGTTGATGCGTCAGGCTATGCTCAGATCGCCAGTTAGCACCAAATGTTGCAGCATTGCTCT									
Brl 87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....								
TH/NP-156/11	T									C
TH/RB-1421/11	T									C
TH/NP-795/11	T									C
TH/RB-833/11	T									C
TH/RB-KHF/11	T									C
TH/CS-866/11	T		T							C
TH/CS-1019/11	T									C
TH/RB-15/12	T									C
TH/NP-68/12	T								G	C
TH/RB-123/12	T									C
TH/CS-65/12	T									C
TH/NP-79/12	T									C
TH/NP-657/12	T		A							G
TH/CS-80712/12	T		T							C
TH/RB-881/12	T									C
TH/AY-2.2/12	T									C
TH/AY-2.7/12	T									C
TH/NP-1157/12	T									G
TH/NP-1169/12	T									G
SWK1	T									C
SWK2	T									C
SWK3	T									C
SWK4	T									C
SWK5	T									C
SWK6	T									C
JS-2004-2	T									C
VCP-3*	T									G
K1*	T									G
83P-5_parent	T									G
attenuated_DR13	T									G
virulent_DR13	T		T							C
Chinju99	T									C

* PED vaccine strains

-----Current Thai isolates-----

	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100
CV777	TTGGTGGTAATGTGGCTGTTTCGTGAGCTAGCGGACTCTTACGAGATTACATACAACCTATAAAATGACTGTGCCAAAGTCAGATCCAAATGTTGAGCTTCT									
Br1 87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....								
TH/NP-156/11	.....T.....T.....A.....									
TH/RB-1421/11	.....T.....T.....A.....									
TH/NP-795/11	.....T.....T.....A.....									
TH/RB-833/11	.....T.....T.....A.....									
TH/RB-KHF/11	.....T.....T.....A.....									
TH/CS-866/11	.....T.....T.....A.....									
TH/CS-1019/11	.....A.....T.....T.....A.....									
TH/RB-15/12	.....TT.....T.....T.....A.....									
TH/NP-68/12	.....T.....T.....T.....C.....A.....									
TH/RB-123/12	.....T.....T.....T.....A.....									
TH/CS-65/12	.....A.....T.....T.....A.....									
TH/NP-79/12	.....T.....T.....T.....A.....									
TH/NP-657/12	.....T.....T.....T.....C.....A.....									
TH/CS-80712/12	.....T.....T.....T.....A.....									
TH/RB-881/12	.....T.....T.....T.....A.....									
TH/AY-2.2/12	.....T.....T.....T.....A.....									
TH/AY-2.7/12	.....T.....T.....T.....A.....									
TH/NP-1157/12	.....T.....T.....T.....C.....A.....									
TH/NP-1169/12	.....T.....T.....T.....C.....A.....									
SWK1	.....T.....T.....T.....A.....									
SWK2	.....T.....T.....T.....A.....									
SWK3	.....T.....T.....T.....A.....									
SWK4	.....T.....T.....T.....A.....									
SWK5	.....T.....T.....T.....A.....									
SWK6	.....T.....T.....T.....A.....									
JS-2004-2	.....A.....T.....T.....A.....									
VCP-3*	.....T.....T.....T.....									
K1*	.....T.....T.....T.....									
83P-5_parent	.....T.....T.....T.....									
attenuated_DR13	.....T.....T.....T.....									
virulent_DR13	.....T.....T.....T.....									
Chinju99	.....C.....T.....T.....T.....									

* PED vaccine strains

	1110	1120	1130	1140	1150	1160	1170	1180	1190	1200
CV777	TGTTTCACAGGTGGATGCATTTAAAACTGGGAATGCAAAACTCCAGAGAAAGAAGGAAAAGAAGAACAAGCGTGAAACCACGCTGCAGCAGCATGAAGAG									
Brl_87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....								
TH/NP-156/11	.....C.....A.....T.A.....									
TH/RB-1421/11	.....C.....C.....A.....T.A.....									
TH/NP-795/11	.....C.....A.....T.A.....									
TH/RB-833/11	.....C.....T.....A.....T.A.....									
TH/RB-KHF/11	.....C.....A.T.T.A.....									
TH/CS-866/11	.....T.A.....AC.....A.....T.A.....									
TH/CS-1019/11	.....C.....A.....T.A.....T									
TH/RB-15/12	.....C.....T.A.....T.A.....									
TH/NP-68/12	.....C.....A.....T.A.....									
TH/RB-123/12	.....C.....A.....T.A.....									
TH/CS-65/12	.....C.....A.....T.A.....T									
TH/NP-79/12	.....C.....A.....T.A.....G.									
TH/NP-657/12	.....C.....A.....T.A.....									
TH/CS-80712/12	.....T.A.....AC.....A.....T.A.....									
TH/RB-881/12	.....C.....A.....T.A.....									
TH/AY-2.2/12	.....C.....A.....T.A.....									
TH/AY-2.7/12	.....C.....A.....T.A.....									
TH/NP-1157/12	.....C.....A.....T.A.....									
TH/NP-1169/12	.....C.....A.....T.A.....									
SWK1	.....C.....G.A.....T.A.....									
SWK2	.....C.....G.A.....T.A.....									
SWK3	.....C.....G.A.....T.A.....									
SWK4	.....C.....G.A.....T.A.....									
SWK5	.....C.....G.A.....T.A.....									
SWK6	.....C.....G.A.....T.A.....									
JS-2004-2	.....C.....A.....T.A.....									
VCP-3*	.....T.C.....A.....A.....									
K1*	.....A.....C.....A.....A.....									
83P-5_parent	.....T.C.....A.....A.....									
attenuated_DR13	.....T.C.....A.....A.....									
virulent_DR13	.....C.....T.....A.....T.A.....									
Chinju99	.....G.....C.....TT.A.....A.....									

* PED vaccine strains

-----Current Thai isolates-----

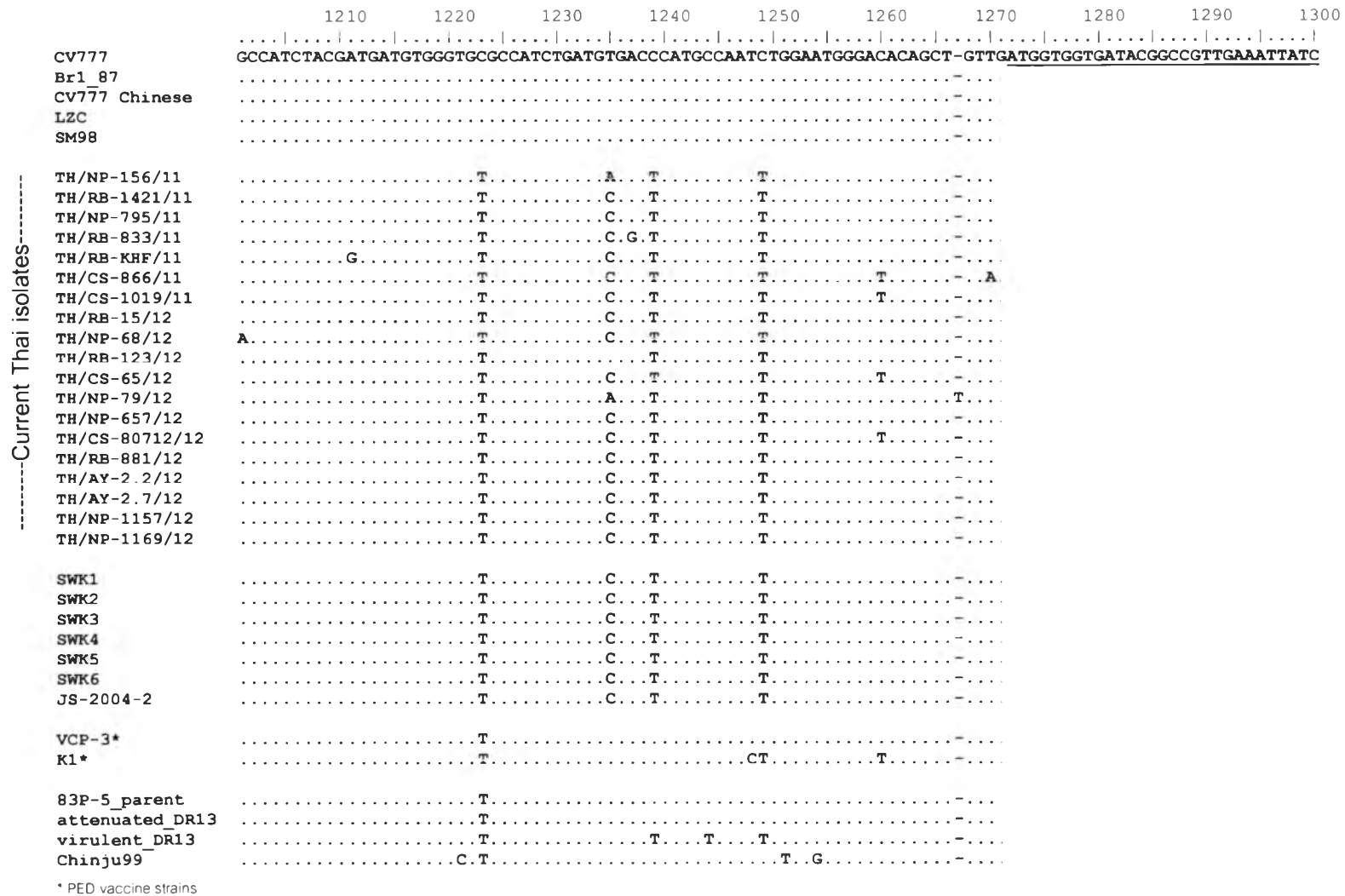


Figure21: The partial N gene nucleotide sequences alignment of current Thai isolates as compared to reference isolates.

	10	20	30	40	50	60	70	80	90	100
CV777	MASVSFQDRGRKRVPLSLYAPLRVTNDKPLSKVLANNAVPTNKGKNDQQIGYWNEQIRWRMRGERIEQPSNWHFYLLGTGPHGDLRYRTRTEGVFVWAK									
Br1 87	.....								
CV777 Chinese	.....								
LZC	.....								
SM98	.....								
TH/NP-156/11	.....G.....A.....									
TH/RB-1421/11	.....Y.....A.....									
TH/NP-795/11	.....I.G.....H.....A.....									
TH/RB-833/11	.....A.....									
TH/RB-KHF/11	.....A.....									
TH/CS-866/11	.....A.....									
TH/CS-1019/11	.....A.....									
TH/RB-15/12	.....A.....									
TH/NP-68/12	.....L.....A.....									
TH/RB-123/12	.....A.....									
TH/CS-65/12	.....A.....									
TH/NP-79/12	.....G.....H.....A.....									
TH/NP-657/12	G.L-----A.....									
TH/CS-80712/12	.....A.....									
TH/RB-881/12	.....G.....H.....A.....									
TH/AY-2.2/12	.....G.....H.....A.....									
TH/AY-2.7/12	.....G.....H.....A.....									
TH/NP-1157/12	.....A.....									
TH/NP-1169/12	.....A.....									
SWK1	.....A.....									
SWK2	.....A.....									
SWK3	.....A.....									
SWK4	.....A.....									
SWK5	.....A.....									
SWK6	.....A.....									
JS-2004-2	.....A.....									
VCP-3*	---X.....A.....									
K1*	.....A.....									
83P-5_parent	.....A.....									
attenuated_DR13	.....A.....									
virulent_DR13	.....A.....									
Chinju99	.....A.....									

-----Current Thai isolates-----

* PED vaccine strains

-----Current Thai isolates-----

	110	120	130	140	150	160	170	180	190	200	
CV777	EGAKTEPTNLGVRKASEKPIIPKFSQQLPSVVEIVEPNTPPASRANSRSRSRGNGNRRSRSPSNRRGNNQSRGNSQNRGNNQGRGASQNRGGNNNNNNKKS										
Br1 87	.....									
CV777 Chinese	.....									
LZC	.....									
SM98	..... I										
TH/NP-156/11	..... N T V										
TH/RB-1421/11	..... N T										
TH/NP-795/11	..... N T										
TH/RB-833/11	..... N I										
TH/RB-KHF/11	..... N I T G										
TH/CS-866/11	..... N T S D H										
TH/CS-1019/11	..... N I T G										
TH/RB-15/12	..... N G H										
TH/NP-68/12	..... N Q T										
TH/RB-123/12	..... N I S										
TH/CS-65/12	..... N I T G										
TH/NP-79/12	..... N T V										
TH/NP-657/12	..... N I S										
TH/CS-80712/12	..... N T S D H V										
TH/RB-881/12	..... N T G										
TH/AY-2.2/12	..... N T										
TH/AY-2.7/12	..... N T										
TH/NP-1157/12	..... N T G K										
TH/NP-1169/12	..... N I S										
SWK1	..... N T										
SWK2	..... N T										
SWK3	..... N T										
SWK4	..... N T										
SWK5	..... N T										
SWK6	..... N T										
JS-2004-2	..... N T L										
VCP-3 *	..... T										
K1*	..... T										
83P-5_parent	..... T										
attenuated_DR13	..... T										
virulent_DR13	D T T I T D										
Chinju99	..... T V										

* PED vaccine strains

	210	220	230	240	250	260	270	280	290	300
CV777	R N Q S N N R N Q S N D R G G V T S R D D L V A A V K D A L K S L G I G E N P D R H K Q Q Q K P K Q E K S D N S G K N T P K K N K S R A T S K E R D L K D I P E W R R I P K G E N S V A A C F G P R G G									
Br1 87	.....								
CV777 Chinese	.....								
LZC	..... M A									
SM98	.....								
TH/NP-156/11	K	P		KL		R	S			
TH/RB-1421/11	K	L		KL		R	S	N		
TH/NP-795/11	K			KL		R	S			
TH/RB-833/11	K			KL	S	R	S			
TH/RB-KHF/11	K			KL		R	S			
TH/CS-866/11	K		L	KL		R	S			
TH/CS-1019/11	K			T	KF		R	S		
TH/RB-15/12	K	S		KL		R	S			
TH/NP-68/12		H		S	KL	XCR	S			
TH/RB-123/12	K			KL		R	S			
TH/CS-65/12	K			T	KF		R	S		
TH/NP-79/12	K			KL		R	S			
TH/NP-657/12	K			KL		R	S			
TH/CS-80712/12	K			K	L	KL		R	S	
TH/RB-881/12	K			KL		R	S			
TH/AY-2.2/12	K			KL		R	S			
TH/AY-2.7/12	K			KL		R	S			
TH/NP-1157/12	K			KL		R	S			
TH/NP-1169/12	K			KL		R	S			
SWK1	K			KL		R	S			
SWK2	K			KL		R	S			
SWK3	K			KL		R	S			
SWK4	K			KL		R	S			
SWK5	K			KL		R	S			
SWK6	K			KL		R	S			
JS-2004-2	K	M		KL		R	S			
VCP-3*	K	M								
K1*	K	M	A							
83P-5_parent	K	M								
attenuated_DR13	K	M								
virulent_DR13	KS			L		R	S			
Chinju99	KS				H	Q			R	

* PED vaccine strains

	310	320	330	340	350	360	370	380	390	400		
CV777	FKNFGDAEFVEKGVDSAGYAQIASLAPNVAALLFGGNVAVRELADSYEITYNYKMTVPKSDPNVELLSQVDAFKTGNAKLQRKKEKKNKRETTLQQHEE											
Br1_87											
CV777 Chinese											
LZC											
SM98											
-----Current Thai isolates-----												
TH/NP-156/11								P	.Q.LN..		
TH/RB-1421/11								P	Q	.Q.LN..	
TH/NP-795/11								P	.Q.LN..		
TH/RB-833/11								P	I	.Q.LN..	
TH/RB-KHF/11								P	.QLLN..		
TH/CS-866/11								I	T	.Q.LN..	
TH/CS-1019/11								I	.Q.LN.D		
TH/RB-15/12								V	.MQ.LN..		
TH/NP-68/12								P	.Q.LN..		
TH/RB-123/12								P	.Q.LN..		
TH/CS-65/12								I	.Q.LN.D		
TH/NP-79/12								P	.Q.LN.G		
TH/NP-657/12								E	.Q.LN..		
TH/CS-80712/12								I	T	.Q.LN..	
TH/RB-881/12								P	.Q.LN..		
TH/AY-2.2/12								P	.Q.LN..		
TH/AY-2.7/12								P	.Q.LN..		
TH/NP-1157/12								P	.Q.LN..		
TH/NP-1169/12								P	.Q.LN..		
SWK1								P	.AQ.LN..		
SWK2								P	.AQ.LN..		
SWK3								P	.AQ.LN..		
SWK4								P	.AQ.LN..		
SWK5								P	.AQ.LN..		
SWK6								P	.AQ.LN..		
JS-2004-2								N	.Q.LN..		
VCP-3*								IP		.Q.N..	
K1*								I	N	.P.Q.N..	
83P-5_parent								IP		.Q.N..	
attenuated DR13								IP		.Q.N..	
virulent DR13								P	N	.Q.LN..	
Chinju99	P								I	A	.P.IQ.N..

* PED vaccine strains

BIOGRAPHY

Miss Supansa Tuanthap was born on July, 14, 1982 at Bangkok, Thailand. She graduated Bachelor degree of Veterinary Medicine with 1st class honors from Faculty of Veterinary Medicine, Mahanakorn University in 2006. After graduated, she worked as veterinarian technical service on swine farms in Vet Agritech Company during 2007-2011. At present, she received a scholarship for Master degree in Veterinary Medicine program, Faculty of Veterinary Science, Chulalongkorn University from H.M. King Bhumibol Adulyadej's 72nd Birthday Anniversary Scholarship during 2011-2012.

